CIVIL QUALITY CONSULTANTS & ENGINEERS

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ISO 9001:2000 CERTIFIED

Job No.: CQCE/BBMP/MSV/W.No.04/2015-16 Date : 25.03.2016

GRADATION FOR WMM
MORTH TABLE-400-11

Client : **Assistant Executive Engineer,** Yelahanka New Town Sub Division, BBMP, Bangalore.
Agency : **Sri. M.S Venkatesh,** Contractor, Bangalore.
Name of Work : Providing pot hole filling and patch repairs in Ward No.04, BBMP, Bangalore.

Date of Testing : 25.03.2016
Material Type : Wet Mix Macadam

Oven Dry Wt 11606

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	455	455	3.9	96.1	95-100
22.4	3985	4440	38.3	61.7	60-80
11.2	2216	6656	57.3	42.7	40-60
4.75	1286	7942	68.4	31.6	25-40
2.36	1146	9088	78.3	21.7	15-30
0.600	1242	10330	89.0	11.0	8-22
0.075	946	11276	97.2	2.8	0-8

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Job No.: CQCE/BBMP/MSV/W.No.04/2015-16 Date: 25.03.2016

Aggregate Impact Value

IS: 2386 Part IV

Client	**Assistant Executive Engineer,** Yelahanka New Town Sub Division, BBMP,
Agency	**Sri. M.S Venkatesh,** Contractor, Bangalore.
Name of the Work	Providing pot hole filling and patch repairs in Ward No.04, BBMP, Bangalore
Type of Mix	Wet Mix macadam
Date of Testing	25.03.2016

Sl No.	Details	Trial No. 1	2	3	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	375	377	379	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	86	88	90	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	289	289	289	
4	Aggregate Impact value = percent fines $100^* (W_2/W_1)\%$	22.93	23.34	23.75	23.34

Comments:

→ Maximum allowable Aggregate Impact value for Wet mix Macadam is 30%

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Job No.: CQCE/BBMP/MSV/W.No.04/2015-16 25.03.2016

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	**Assistant Executive Engineer,** Yelahanka New Town Sub Division, BBMP,
Agency	**Sri. M.S Venkatesh,** Contractor, Bangalore.
Name of Work	Providing pot hole filling and patch repairs in Ward No.04, BBMP, Bangalore.
Technical Reference	IS 2386(Part 1) 1963 (RA 2011)
Type of Mix	Wet Mix Macadam
Sample ID	WMM Layer
Date of Testing	25.03.2016

Result : Flakiness Index = **11.58%**

Elongation Index = **13.36%**

Result : Combined Flakiness & Elongation index **24.94%**

Comments:

Maximum allowable Flakiness & Elongation Index for Wet Mix Macadam is 30%

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Job No.: CQCE/BBMP/MSV/W.No.04/2015-16 Date : 25.03.2016

ATTERBERG LIMITS TEST FOR WMM
MORTH TABLE-400-11

Client : **Assistant Executive Engineer,** Yelahanka New Town Sub Division, BBMP, Bangalore.

Agency : **Sri. M.S Venkatesh,** Contractor, Bangalore.

Name of Work : Providing pot hole filling and patch repairs in Ward No.04, BBMP, Bangalore.

Date of Testing : 25.03.2016

Material Type : Wet Mix Macadam

As per MORTH Table 400-13

Sl. No.	Particulars	Test Results	Standards as per Specifications
1	Liquid Limit	22.50	-
2	Plasticity Index, %	Non Plastic	6.0% Maximum.

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Job No: CQCE/BBMP/MSV/W.No.04/2015-16 Date: 29.03.2016

TEST REPORT ON DETERMINATION OF BITUMEN CHARACTERISTICS

CLIENT	:	**Assistant Executive Engineer,** Yelahanka New Town Sub Division, BBMP, Bangalore.
AGENCY	:	**Sri. M.S Venkatesh,** Contractor, Bangalore.
NAME OF WORK	:	Providing pot hole filling and patch repairs in Ward No.04, BBMP, Bangalore.
SAMPLE ID	:	Bitumen (Bituminous Concrete)
PERIOD OF TESTING	:	29.03.2016

The results of the tests conducted on the Bitumen sample for Bituminous Concrete

Sl.No	Description	Test Method as per IS	Test Result	Requirement as per IS: 73-2013
1	Penetration at 25°C, 100g, 5 Sec 1/10 mm	IS: 1203-1978 (RA-2009)	68	60 to 70
2	Softening point, °C	IS: 1205-1978 (RA-2009)	49	Min. 45
3	Ductility at 27°C, cm	IS: 1208-1978 (RA-2009)	100 >	Min. 50
4	Flash Point, °C	IS: 1209-1978 (RA-2009)	298	Min. 220

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Job No.: CQCE/BBMP/MSV/W.No.04/2015-16 29.03.2016

Aggregate Gradation Test

IS : 2386 Part I

Client	**Assistant Executive Engineer,** Yelahanka New Town Sub Division, BBMP,
Agency	**Sri. M.S Venkatesh,** Contractor, Bangalore.
Name of the Work	Providing pot hole filling and patch repairs in Ward No.04, BBMP, Bangalore.
Sample I / D	Hot Mix Plant, Bangalore
Type of Mix	Bituminous Concrete
Date of Testing	29.03.2016

Total Weight of Sample: 5380 gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	JOBMIX Gradation as per MORTH	Remarks
19	0	0	0	100	100	Gradation satisfies Bituminous concrete Grade-II specification as per MORTH
13.2	495	9.20	9.20	90.80	79 - 100	
9.5	520	9.67	18.87	81.13	70 - 88	
4.75	685	12.73	31.60	68.40	53 - 71	
2.36	615	11.43	43.03	56.97	42 - 58	
1.18	585	10.87	53.90	46.10	34 - 48	
0.600	653	12.14	66.04	33.96	26 - 38	
0.300	574	10.67	76.71	23.29	18 - 28	
0.150	415	7.71	84.42	15.58	12 - 20	
0.075	430	7.99	92.42	7.58	4 - 10	

Total Weight of Sample: 4825 gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	JOBMIX Gradation as per MORTH	Remarks
19	0	0	0	100	100	Gradation satisfies Bituminous concrete Grade-II specification as per MORTH
13.2	658	13.64	13.64	86.36	79 - 100	
9.5	485	10.05	23.69	76.31	70 - 88	
4.75	635	13.16	36.85	63.15	53 - 71	
2.36	540	11.19	48.04	51.96	42 - 58	
1.18	630	13.06	61.10	38.90	34 - 48	
0.600	547	11.34	72.44	27.56	26 - 38	
0.300	364	7.54	79.98	20.02	18 - 28	
0.150	274	5.68	85.66	14.34	12 - 20	
0.075	358	7.42	93.08	6.92	4 - 10	

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Job No.: CQCE/BBMP/MSV/W.No.04/2015-16 29.03.2016

Aggregate Impact Value

IS: 2386 Part IV

Client	**Assistant Executive Engineer,** Yelahanka New Town Sub Division, BBMP,
Agency	**Sri. M.S Venkatesh,** Contractor, Bangalore.
Name of the Work	Providing pot hole filling and patch repairs in Ward No.04, BBMP, Bangalore.
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Bituminous Concrete
Date of Testing	29.03.2016

Sl No.	Details	Trial No.		Average
		1	2	
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	374	376	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	83	85	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	291	291	
4	Aggregate Impact value = percent fines 100* (W_2/W_1) percent	22.19	22.61	22.40

Comments:

→ Maximum allowable Aggregate Impact value for Bituminous Concrete is 24%

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Job No: CQCE/BBMP/MSV/W.No.04/2015-16

29.03.2016

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	**Assistant Executive Engineer,** Yelahanka New Town Sub Division, BBMP, Bangalore
Agency	**Sri. M.S Venkatesh,** Contractor, Bangalore.
Name of Work	Providing pot hole filling and patch repairs in Ward No.04, BBMP, Bangalore.
Technical Reference	IS 2386(Part 1) 1963 (RA 2007)
Type of Mix	Bituminous Concrete
Date of Testing	29.03.2016

Result : Flakiness Index = **12.36%**

Elongation Index = **14.15%**

Result : Combined Flakiness & Elongation index **26.51%**

Comments:

→ Maximum allowable Flakiness & El s

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Ref No: CQCE/BBMP/MSV/W.No.04/2015-16 29.03.2016

Specific Gravity And Water Absorption Test
IS: 2386 Part III

Client	**Assistant Executive Engineer,** Yelahanka New Town Sub Division, BBMP,
Agency	**Sri. M.S Venkatesh,** Contractor, Bangalore.
Name of the Work	Providing pot hole filling and patch repairs in Ward No.04, BBMP, Bangalore.
Type of Mix	Bituminous Concrete
Date of Testing	29.03.2016

Sl. No.	Details	Notation	Test Number			Mean Value
			Test 1	Test 2	Test 3	
1	Weight of aggregate suspended in water with the basket	W_1 g	2021	2023	2025	
2	Weight of basket suspended in water	W_2 g	755	755	755	
3	Weight of saturated aggregate in water	$(W_1 - W_2) = W_s$ g	1266	1268	1270	
4	Weight of saturated surface dry aggregate in air	W_3 g	2015	2017	2019	
5	Weight of water equal to the volume of the aggregate	$(W_3 - W_s)$ g	749	749	749	
6	Weight of oven dried aggregate	W_4 g	2009	2010	2011	
7	Specific Gravity	$W_4/(W_3-W_s)$	2.682	2.684	2.685	2.684
8	Apparent Specific gravity	$W_4/(W_4-W_s)$	2.704	2.709	2.714	2.709
9	Water Absorption	$((W_3-W_4)*100)/W_4$	0.30%	0.35%	0.40%	0.35%

Comments:
→ Maximum allowable Aggregate Water absorption value for Bituminous Concrete is 2.0%

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Job No.: CQCE/BBMP/MSV/W.No.04/2015-16 Date: 30.03.2016

TEST REPORT ON STABILITY OF MIX

Client	:	**Assistant Executive Engineer,** Yelahanka New Town Sub Division, BBMP, Bangalore.
Agency	:	**Sri. M.S Venkatesh,** Contractor, Bangalore.
Name of the Work	:	Providing pot hole filling and patch repairs in Ward No.04, BBMP, Bangalore.
Source of location	:	Hot mix Plant, Bangalore
Type of Mix	:	Bituminous Concrete
Date of Testing	:	30.03.2016

The results of the tests conducted on the Bituminous Concrete mix sample are as follows:

Sl. No	Description	Test Result 1	Test Result 2	Requirement as per MORTH (Table 500-19)
1	Marshal Stability, Kn	9.68	10.25	9 Kn (min)
2	Marshal flow, mm	3.69	2.47	2 – 4
3	Percent air voids in Mineral Aggregate	13.36	14.52	13 – 15
4	Voids in Compacted Mix	4.58	5.36	3 – 6
5	Percent Voids filled with Bitumen	73.36	74.25	65 - 75
6	Density, g/cc	2.26	2.27	--

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BITUMEN CONTENT AND GRADATION DETERMINATION OF BITUMINOUS CONCRETE

CLIENT	**Assistant Executive Engineer,** Yelahanka New Town Sub Division, BBMP, Bangalore.
AGENCY	**Sri. M.S Venkatesh,** Contractor, Bangalore.
NAME OF THE WORK	Providing pot hole filling and patch repairs in Ward No.04, BBMP, Bangalore.
SAMPLE ID	Hot Mix Plant, Bangalore
DATE OF TESTING	30.03.2016

BITUMEN CONTENT DETERMINATION

Description	Sample 1	Sample 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	469.5	470
3. Weight of Asphalt and Mineral matter Extracted, g	30.5	30
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g	-	-
6. Weight of Bitumen Extracted, g (corrected)	30.5	30
7. Bitumen content in %	6.10	6.00
8. Average	6.05	

GRADATION AFTER EXTRACTION

TABLE - 1

SIEVE SIZE	Percent Passing, %		JOBMIX
mm	Sample 1	Sample 2	Gradation
19	100.00	100.00	100
13.2	95.36	96.41	79-100
9.5	82.52	83.97	70-88
4.75	66.36	67.41	53-71
2.36	55.78	56.24	42-58
1.18	45.63	46.54	34-48
0.6	33.47	34.52	26-38
0.3	24.63	25.41	18-28
0.15	16.87	17.52	12-20
0.075	5.49	6.53	4-10

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